

## ABSTRACT

An improved chemical vapor deposition system including a lid having a channel  
5 configured for delivering reactive cleaning gas to the interior of the vapor deposition system.  
The lid including a cleaning gas distribution channel fluidly connected to a plurality of cleaning  
gas injection ports. The lid geometry is configured to generate desirable concentration gradients  
of reactive cleaning gas to the interior of a vapor deposition chamber. In some embodiments, the  
concentration gradient is selected to compensate for the temperature dependence of cleaning  
10 reactions. Methods of using the disclose system are disclosed.